CLAIMS

1. A method of forming a thin light polarization film on a substrate, comprising the steps of:

(a) depositing a thin solid film polarizer onto a flexible polymeric carrier sheet,

(b) applying a photo-curable glue onto said substrate,

(c) bringing said thin solid film polarizer into contact with said glue,

(d) illuminating and curing said glue, and

(e) removing said carrier sheet.

2. A method as claimed in claim 1 wherein said step of illuminating and curing said glue is carried out by illuminating said glue in a pattern whereby a pattern of cured glue is formed and whereby when said carrier sheet is removed said thin solid film polarizer only remains attached to said glue in said pattern.

3. A method as claimed in claim 2 wherein regions of glue that are not cured are removed by a solvent.

4. A method as claimed in claim 2 wherein said illumination is carried out through a patterned mask.

5. A method as claimed in claim 4 wherein said mask is a shadow mask or a photomask formed by photolithography.

6. A method as claimed in claim 1 wherein said light polarization film is formed on said substrate in a pattern formed by regions of at least two different directions of polarization.

7. A method as claimed in claim 6 wherein said method comprises the steps of:

(a) depositing a first solid thin film polarizer on a first flexible carrier, said first polarizer having a first polarization direction,

(b) applying a photo-curable glue to said substrate,

(c) bringing said first solid thin film polarizer into contact with said glue,

(d) illuminating said glue in a first pattern to form a pattern of cured glue having said first solid thin film polarizer adhered thereto,

(e) removing said first flexible carrier leaving said first solid thin film polarizer adhered to said substrate by said glue in said first pattern,

(f) depositing a second solid thin film polarizer on a second flexible carrier, said second polarizer having a second polarization direction,

(g) applying a photo-curable glue to said substrate,

(h) bringing said second solid thin film polarizer into contact with said glue,

(i) illuminating said glue in a second pattern to form a pattern of cured glue having said second solid thin film polarizer adhered thereto, and

(j) removing said second flexible carrier leaving said second solid thin film polarizer adhered to said substrate by said glue in said second pattern.

8. A method as claimed in claim 6 wherein said light polarization film is divided into pixels having different light polarization directions.

9. A method as claimed in claim 8 wherein said pixels are divided into sub-pixels.

10. A method as claimed in claim 9 wherein said sub-pixels within a pixel are formed with different absorption colors.

11. A method as claimed in claim 1 wherein said light polarization film is formed on said substrate in a plurality of pixels.

12. A method as claimed in claim 11 wherein the pixels have at least two different directions of polarization.

13. A method as claimed in claim 11 wherein all the pixels have the same direction of polarization.

14. A method as claimed in claim 1 wherein said flexible carrier sheet is formed of an isotropic or non-isotropic polymeric material.

15. A method as claimed in claim 1 wherein said carrier sheet includes a detachment layer.

16. A method as claimed in claim 15 wherein said detachment layer also serves as a polarization alignment layer.

17. A method as claimed in claim 16 wherein said detachment layer comprises a film of material selected from the group consisting of paraffin wax, mineral oils, barium stearate, resins, uniaxially aligned polyethyleneterephthalate or the like.

18. A method as claimed in claim 17 wherein the detachment and alignment layer is rubbed mechanically to obtain a desired orientation.

19. A method as claimed in claim 1 wherein said thin light polarization film is formed on a substrate forming the inner surface of a liquid crystal cell.

20. A method of forming a thin light polarization film comprising the steps of:

(a) depositing a layer of photoalignable material on a substrate,

(b) illuminating the photoalignable layer with actinic radiation to define a principal absorption axis of said photoalignable layer,

(c) applying a thin layer of an isotropic absorber solution onto said photoalignable layer,

(d) partially evaporating said solution to form a gel, and

(e) baking said gel to form an anisotropic absorber layer.

21. A method as claimed in claim 20 wherein said actinic radiation is linearly polarized and the principal absorption axis of said photoalignable layer is orthogonal to the polarization vector of said actinic radiation.

22. A method as claimed in claim 20 wherein said actinic radiation is non-polarized and is incident on said photoalignable layer at an oblique angle.

23. A method as claimed in claim 20 wherein the photoalignable layer is illuminated through a mask whereby only selected regions of said layer are aligned.

24. A method as claimed in claim 23 wherein the photoalignable layer is illuminated through several masks in sequence whereby different regions of said photoalignable layer may be formed with different alignment axes.

25. A method as claimed in claim 20 wherein said photoalignable layer is formed with a plurality of pixels.

26. A method as claimed in claim 25 wherein said pixels include at least two different alignment axes.

27. A method as claimed in claim 25 wherein all said pixels are formed with the same alignment axis.

28. A method as claimed in claim 20 wherein said photoalignable layer is illuminated through a photo-patterned mask that transforms linearly polarized or non-polarized actinic radiation into actinic radiation having a spatial distribution of polarization vectors.

29. A method as claimed in claim 28 wherein said photo-patterned mask is a light polarization mask.

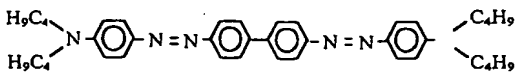
30. A method as claimed in claim 29 wherein said photo-patterned mask is a birefringence mask.

31. A method as claimed in claim 20 wherein more than one absorber material may be provided and different absorbers are chosen with different colors.

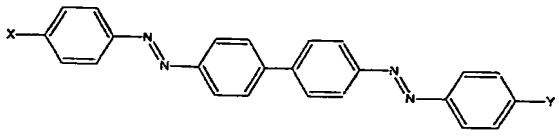
32. A method as claimed in claim 20 wherein said absorber comprises lyotropic liquid crystal.

33. A method as claimed in claim 20 wherein said photoalignable material is an organic azodye.

34. A method as claimed in claim 33 wherein the azodye has the structure:

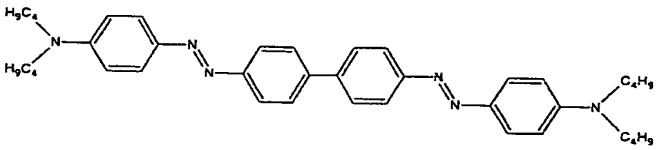


35. A method as claimed in claim 33 wherein the azodye is selected from the group of dyes having the structures:

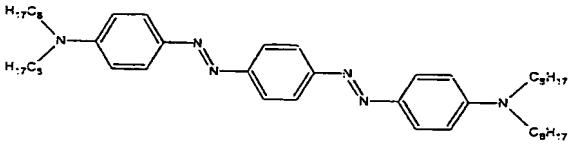


X, Y=-NR, -N(R)$_2$, -R; where R=Alkyl($C_1$-$C_{18}$)

(1)



(2)



(3)

36. A method as claimed in claim 20 wherein said photoalignable material is deposited in a layer of from 0.05 to 1.5μm thick.

37. A method as claimed in claim 20 wherein said absorber material has a thickness of from 0.3 to 1.5μm.

38. A method as claimed in claim 20 wherein said thin light polarization film is formed on a substrate forming an inner surface of a liquid crystal cell.

39. A thin light polarization film deposited on a substrate and comprising a plurality of pixels, wherein said pixels are formed with different axes of polarization.

40. A liquid crystal cell comprising a liquid crystal material received within front and rear substrates, wherein an internal surface of one of said substrates is formed with deposited thereon a thin light polarization film as claimed in claim 37.